AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0015] with the following amended paragraph:

[0015] When the internal status x(t) (where t is a discrete time, t = 0, 1, 2, □□□) of the mapping is observed by using an ~~in-phase conversion~~ isomorphic transform and quantization expression

$$Y(t) = 2/\pi \times \arcsin(x(t))^{1/2} \times 2^n \quad \ldots(3)$$

Y (t) becomes a rational number, and order is observed in the chaos. An integer is included in the rational number. A quantized resolution n may be selected such that Y (t) becomes an integer. A chaos time-series Y(t)-t includes a fractal structure. The present invention utilizes the characteristics of this. In the following explanation, the ~~in-phase conversion~~ isomorphic transform and quantized value of the quantized resolution n is expressed as $Y_n(t)$.

Please replace paragraph [0016] with the following amended paragraph:

[0016] When an integer Y(t) has been given, this integer can be converted into the original irrational number x(t) by using the following expression that is an inverse ~~conversion~~ transform expression of the expression (3).

$$x(t) = \{\sin \pi Y(t) / 2^{n+1}\}^2 \quad \ldots(4)$$

Please replace paragraph [0022] with the following amended paragraphs:

[0022] At step 2, an internal status x(0) that becomes an irrational number is obtained by giving an integer $Y_3(0) = 2$ and n = 3 to the inverse ~~conversion~~ transform expression (4) of ~~in-phase conversion~~ isomorphic transform and quantization respectively.

Please replace paragraph [0025] with the following amended paragraph:

[0025] At step 5, when the data retroactive to the sixth generation has been obtained, the ~~in-phase conversion~~ isomorphic transform and quantized value of the internal status x(-6) converges to an integer (= 68) plus 0.5000 □□□ when the quantized resolution n = 7. The internal status x(0) that becomes an irrational number is obtained from the quantized initial value $Y_3(0)$, and the calculation of the inverse calculation expression (5) of the logistic map is executed according to the second bit string $\{y\}_2$. Thus, $Y_7(-6)$ is obtained using the ~~in-phase conversion~~ isomorphic transform and quantization expression (3). In this case, an integer (= 68) (this means a value excluding 0.5) becomes a compressed code.

Please replace paragraph [0029] with the following amended paragraph:

[0029] On the other hand, the expansion processing of a compressed code is a process opposite to the process of generating a compressed code. Therefore, the process opposite to the arrows shown in Fig.1 is carried out. First, an irrational number x(-6) is obtained by the inverse ~~conversion~~ transform expression (4) of ~~in-phase conversion~~ isomorphic transform and quantization of $Y_7(-6)$. In this case, it is necessary to have 0.500 □□□ added to the integer.

Please replace paragraph [0030] with the following amended paragraph:

[0030] An internal status value of x(0) is obtained from an irrational number x(-6) by the sequential calculation expressions (1) and (2) of the logical map. During this process, $\{y\}_2$ is restored when n=1 of the ~~in-phase conversion~~ isomorphic transform and quantization expression (3) is obtained.

Please replace paragraph [0031] with the following amended paragraph:

[0031] In the ~~in-phase conversion~~ isomorphic transform and quantization expression (3) of the quantized initial value x(0), the binary code string three bits of the integer $Y_3(0)$ substituted with n=3 is $\{y\}_1$ that is to be restored. The original information $\{y\}_1$ and $\{y\}_2$ can be restored in this way.

Please replace paragraph [0033] with the following amended paragraph:

[0033] In the above embodiment, after the nine-bit information {y} = (010110011) has been compressed to a seven-bit compressed code, the original information is obtained by expanding this compressed code. This is one example of carrying out a reversible compression/expansion. It is not possible to decide indiscriminately the precision of the forward and inverse calculations of an irrational number x(0), and calculation precision of the ~~in-phase conversion~~ isomorphic transform and quantization and inverse conversion, or how to select $\{y\}_1$ and $\{y\}_2$ for binary decimal 52 bits. These also depend on the data structure of the information to be compressed.

Please replace paragraph [0034] with the following amended paragraph:

[0034] The ~~in-phase conversion~~ isomorphic transform and quantization of the logistic map is a linear conversion of the integer Y(t) as a result. A fine structure within a linear quantum also keeps a linear relationship. Quanta (integers) are all fair including a complementary relationship. The principle of guaranteeing the complete restoration lies in this.

Please replace paragraph [0036] with the following amended paragraph:

[0036] Finding a reversible loop in chaos is a necessary condition for establishing a chaos industrial technology. A chaos block encryption and a chaos stream encryption are examples to which an inter-quantum reversible process has been applied. The reversible compression/expansion using chaos according to the present invention is a chaos industrial technology that has been extended to a correspondence relationship in the quantum fine structure. This is because the nonlinear quantized observation or ~~in phase conversion~~ isomorphic transform and quantization of the logistic map and the inverse conversion are the measurement of linearity of the internal status as a result.